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A STUDY OF SOME CHARACTERISTICS
OF VEGETABLE OILS

BY

JAMES B. McNAIR

ASSISTANT CURATOR OF ECONOMIC BOTANY

B. E. DAHLGREN

ACTING CURATOR, DEPARTMENT OF BOTANY

EDITOR



CHICAGO, U. S. A.

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A STUDY OF SOME CHARACTERISTICS OF VEGETABLE OILS

JAMES B. MCNAIR

18 Feb 58 OR
A number of years ago it occurred to the writer that there might be a relationship between the melting point of an oil of a plant and the temperature of its environment. The idea was suggested by the fact that in general the melting points of marine animal oils are lower than the melting points of the oils of land animals. In accordance with this idea tropical plants should have oils of higher melting points than those of plants of temperate climates; seeds may have oils of lower melting points than those contained in seed coverings; plants of tropical origin may retain their high melting-point oils in temperate climates; and oil properties may be of value in species identification.

In the tissues of most plants there are small particles of oil that may serve as reserve food for the plant or its seedlings. The most common storage place for oil is the seed, where oil is almost always present in at least a small amount, and in some cases it may be the dominant form of stored food. Oil is, however, not confined to seeds, but occurs also in the flesh of fruits (olives, oil palm fruits), in rootstocks and tubers (potato, iris, and sedges), and in bulbs (onion).

DATA AND DEFINITIONS USED

Data of approximately 318 oils, fats, and waxes have been assembled and reclassified for this article from Volume II of the sixth edition of Julius Lewkowitsch's *Chemical Technology and Analysis of Oils, Fats and Waxes*, published in 1922.

In the present article oils are classified in four groups: drying, semi-drying, non-drying, and fats. In order that the classification used may be better understood these four groups are defined as follows:

Drying oils are so called because they absorb oxygen from the air and dry to an elastic skin when exposed to the air in a thin layer. Linseed oil is a good example. The drying power is directly proportional to the size of the iodine value; consequently the best drying oils are those which absorb the greatest amount of iodine. The drying oils likewise have the lowest melting points of the oils here considered. Chemically they are glycerides of fatty acids

belonging to the linolenic and linolic groups, oleic acid forming only a small proportion of the liquid fatty acids.

Semi-drying oils have melting points and iodine values that lie between those of the drying oils and the non-drying oils. They differ chemically from drying oils by an almost complete absence of linolenic acid, while they are differentiated from non-drying oils by a larger content of linolic acid. The proportion of linolic acid decreases as the iodine value decreases. Cotton seed, maize, and sesame oils are examples of this group.

Non-drying oils have higher melting points and lower iodine values than those exhibited by the members of the drying and semi-drying oils. Linolenic acid is completely absent and linolic acid is present in small quantities only. Olive and castor oils are examples of this group.

Vegetable fats are oils that are solid in temperate climates. They present, however, a variety of gradations from the soft, buttery mass of laurel oil to the hard, waxlike Japan tallow. As the hardness of the fats increases approximately in direct proportion to the decrease of the content of glycerides of oleic and linolic acids, the iodine value would most appropriately determine, in the absence of other more striking chemical characteristics, the order in which the individual fats may be enumerated. Examples of fats are cacao butter, coconut oil, Japan wax, and myrtle wax.

Vegetable waxes as a group have higher melting points and lower iodine numbers than any of the oils here considered. They are not glycerides, but are chemical mixtures of fatty esters of higher monohydric aliphatic and phytosterol alcohols. Waxes are distinguished from fats by the fact that waxes are esters of monohydric alcohols while fats are esters of the trihydric alcohol, i.e., glycerol. Carnauba and palm waxes are examples.

Some 318 oils have been studied. Of these 318 oils, 62 are drying oils of low melting point, 83 are semi-drying oils of higher melting point, 71 are non-drying oils of still higher melting point, and 102 are fats.

OILS IN SEED KERNELS AND SEED COVERINGS

Oils are chiefly found accumulated in seeds. In fact, practically all the oils considered in this article come from this source. However, it may be well at this point to discuss the properties of the oils from seed kernels in contrast to the oils from seed coverings.

If it is true that the environment in which an oil is produced should influence its melting point, i.e., that oils produced in tropical plants should have higher melting points than those produced in cold climates, then it might be expected that oils found in seed coverings should have higher melting points than oils found in seed kernels of the same plant. It is understood that the diurnal fluctuations in air temperature to which the seed covering is subjected cause the daily maximum temperature of the seed covering to be greater than the daily maximum temperature of the seed kernel. In the tropics, where the minimum temperature is higher and the diurnal and seasonal fluctuations in temperature are less than in the temperate zone, the melting points of the seed covering

PHYSICAL AND CHEMICAL PROPERTIES OF OILS FROM KERNELS
AND SEED COVERINGS

Family	Plant	Oil Source	Sp. Gr. (15° C.)	Sapon. Value	Iodine Value	Class
Euphorbiaceae	<i>Sapium sebiferum</i>	covering,	.915-.918 .9458	179.0-205.7 203.8-210.4	19.0 - 37.7 145.6 -160.7	fat drying
		kernel				
Anacardiaceae	<i>Rhus laurina</i>	covering	.9011	157.1	11.44	fat
		covering				
	<i>Rhus succedanea</i>	covering	.975	217.5-237.5	4.2 - 15.1	fat
		covering				
Oleaceae	<i>Rhus diversiloba</i>	covering	.9896	220.6	8.79	fat
		kernel				
		kernel				
Oleaceae	<i>Olea europaea</i>	covering,	.916-.9196 .9184-.9191	188.7-203.0 182.3-183.8	77.28- 91.7 86.99- 87.8	non- drying
		kernel				
Palmae	<i>Elaeis guineensis</i>	covering,	.9209-.9245 .9119	196.3-205.5 246.3-250.0	53.0 - 57.44 10.3 - 17.5	fat fat
		kernel				
	<i>Astrocaryum vulgare</i>	covering, kernel	.916	196.5-197.2 242.5-243.3	74.8 - 75.7 10.4 - 11.2	fat fat

and seed kernel oils would be more nearly equal, as well as higher than the melting points of the temperate oils. This may be influenced by the size and structure of the fruit. In agreement with this theory the oils from the seed coverings of the Chinese tallow tree (*Sapium sebiferum* Roxb.) and various species of sumac (*Rhus*) have higher melting points than their corresponding seed kernel oils. However, in the cases of the African oil palm (*Elaeis guineensis* Jacq.) and the Tucum palm (*Astrocaryum vulgare* Martens) the kernel oils have higher melting points than oils of the seed coverings;

but it should be noted that all of these oils are from tropical plants and that the kernel oils have higher melting points than the kernel oils of temperate plants. In the case of the olive, another tropical plant, both oils are similar.

WAXES ON STEMS AND LEAVES

Vegetable waxes are for the most part exudations of plant leaves and stems, and mostly occur in small quantities. Of a total of twenty waxes considered four are found on plants growing in temperate climates and twelve are from tropical or sub-tropical plants.

These waxes occur in the Gramineae, Palmae, Moraceae, Papaveraceae, Saxifragaceae, Linaceae, Euphorbiaceae, Malvaceae, Bombacaceae, Asclepiadaceae, and Compositae.

OILS IN RELATION TO SPECIES

Iodine numbers, saponification values, and specific gravities of the various oils may shed some light on specificity.

The attached tables may be of value in qualitative analysis and an aid to the determination of any oil on the list. For instance, we may have an oil of unknown origin with a saponification number of 114.5, an iodine number of 132.6–157.5, and a specific gravity number of .924–.927 at 15°C. Referring to the list of iodine numbers we find that it may be the oil of *Couepia grandifolia*, *Lepidium sativum*, *Manihot Glaziovii*, *Hevea brasiliensis*, *Helianthus annuus*, *Glycine hispida*, *Guizotia abyssinica*, *Aleurites ricinodendron*, *Amoora Rohituka*, *Juglans regia*, *Papaver somniferum*, or any of some forty-nine other plants. However, when we note the determined saponification number of 114.5 we find the number of plants that will correspond is restricted to *Linum usitatissimum* and *Papaver somniferum*. As *Linum usitatissimum* does not have an iodine value within the specified range, the oil must be of *Papaver somniferum*, provided, of course, the source plant is among those listed.

OILS IN RELATION TO GENERA

There is close agreement between the oils of the different species of a genus. For instance, in the genus *Trifolium*:

Trifolium agrarium: sp. gr. at 15°C., 0.9290; N_D 30°C., 1.4757; sap. v. 188.4; iod. v. 75.9; solid. pt. —15°C. *Trifolium hybridum*: sp. gr. at 15°C., 0.9250; N_D 30°C., 1.4757; sap. v. 187.2; iod. v. 65.9; solid. pt. —14°C. *Trifolium incarnatum*: sp. gr. at 15°C., 0.9170; N_D 30°C., 1.4723; sap. v. 181.3; iod. v. 61.6; solid. pt. —9°C. *Tri-*

folium repens: sp. gr. at 15°C., 0.9170; N_D 30°C., 1.4745; sap. v. 189.4; iod. v. 68.5; solid. pt. —16°C.

OILS IN RELATION TO FAMILIES

Oils are found in at least 83 (30 per cent) of the plant families out of the 277 families listed by Engler and Prantl.

Within the smaller families the oils of the respective genera and their species are in close agreement as in the Cruciferae, Cucurbitaceae, Lauraceae, Myristicaceae, Pinaceae, Polygalaceae, Rutaceae, Sapindaceae, Sapotaceae, Simarubaceae, Solanaceae, and the Umbelliferae.

In the large families the oils of the different genera are usually in close agreement when grouped according to tribes. For instance:

Leguminosae

Subfamily I. Mimosoideae: (F)¹ Parkia, (ND) Pentaclethra

Subfamily II. Caesalpinioideae: (SD) Caesalpinia

Subfamily III. Papilionatae:

Tribe 3. Genisteae: (SD) Cytisus, (SD) Spartium, (ND) Lupinus

Tribe 4. Trifolieae: (ND) Trigonella, (ND) Trifolium, (ND) Ornithopus, (ND) Melilotus, (ND) Medicago

Tribe 5. Loteae: (ND) Lotus, (ND) Anthyllis

Tribe 6. Galegeae: (ND) Galega, (D) Robinia, (D) Caragana, (D) Amorpha

Tribe 7. Hedysareae: (ND) Arachis, (ND) Onobrychis

Tribe 8. Viciae: (SD) Vicia, (SD) Cicer, (SD) Pisum, (SD) Lens

Tribe 9. Phaseoleae: (SD) Voandezia, (SD) Cajanus, (SD) Dolichos, (SD) Canavalia, (SD) Mucuna urens, (SD) Vigna, (SD) Phaseolus Mungo, (SD) Phaseolus lunatus, (SD) Phaseolus inamoenus, (SD) Phaseolus coccineus, (SD) Phaseolus vulgaris, (D) Glycine

Tribe 10. Dalbergieae: (F) Dipteryx, (F) Pongamia

Gramineae

Tribe 1. Paniceae: (D) Panicum

Tribe 2. Maydeae: (SD) Zea

Tribe 3. Oryzeae: (ND) Oryza

Tribe 6. Andropogoneae: (SD) Sorghum

Tribe 7. Phalarideae: (SD) Phalaris

Tribe 12. Hordeae: (SD) Secale, (SD) Triticum, (SD) Hordeum

Cucurbitaceae

Tribe 1. Cumerineae: (F) Hodgsonia, (ND) Telfairia, (F) Luffa, (SD) Acanthosicyus, (SD) Cucumis, (SD) Citrullus, (SD) Cucurbita, (SD) Bryonia

Tribe 3. Elaterieae: (SD) Echinocystis

Guttiferae

Tribe 2. Moronobeae: (F) Symphonia, (F) Pentadesma

Tribe 3. Garcinieae: (F) Garcinia

Tribe 4. Calophylleae: (ND) Calophyllum, (ND) Mesua

¹The abbreviation D = drying oil, SD = semi-drying oil, ND = non-drying oil, and F = fat.

OILS OF TROPICAL AND SUBTROPICAL PLANTS

Of the 83 plant families known to contain oils, 40, or 48.1 per cent, are mainly tropical or subtropical in habitat. According to these statistics, therefore, oils are more frequently found in tropical and subtropical than in plants of temperate regions.

Of the 62 drying oils, 25, or 40 per cent, are from tropical and subtropical plants. Drying oils are therefore not as frequently met with in tropical plants as in plants grown elsewhere.

Of the 83 semi-drying oils, 41, or 49 per cent, are from tropical plants.

Of the 71 non-drying oils, 42, or 59 per cent, are from tropical plants.

Of the 102 fats, 101, or 99.97 per cent, are from tropical plants.

From these data it may be concluded that tropical and subtropical plants are more likely to have fats (highest melting-point oils) than non-drying, semi-drying, or drying oils (lower melting-point oils).

The percentages of drying oils, semi-drying oils, non-drying oils, and fats increase among tropical plants as follows: drying 7.86 per cent, semi-drying 12.89 per cent, non-drying 13.2 per cent, and fats 31.76 per cent.

CHARACTER OF OILS IN RELATION TO CLIMATE OF HABITAT

HABITAT	DRYING OILS		SEMI-DRYING OILS		NON-DRYING OILS		FATS	
	No.	%	No.	%	No.	%	No.	%
Tropical	25	7.86	41	12.89	42	13.2	101	31.76
Temperate	37	11.63	42	13.20	29	9.12	1	00.03
Total	73	19.49	133	26.10	90	22.32	105	31.67

OILS OF NON-TROPICAL AND NON-SUBTROPICAL PLANTS

Of the 83 plant families known to contain oils, 15, or 18.0 per cent, are mainly temperate in habitat.

Of the 62 drying oils, 37, or 59 per cent, are from plants growing in temperate climates. Of the 83 semi-drying oils, 42 are from temperate plants. Of the 71 non-drying oils, 29 are from plants growing in temperate zones.

Of the 102 fats only one is from a plant growing in a temperate climate.

From these data it may be concluded that plants growing in temperate climates are more likely to have drying oils (lower melting-point oils) than semi-drying or non-drying oils and fats (higher melting-point oils).

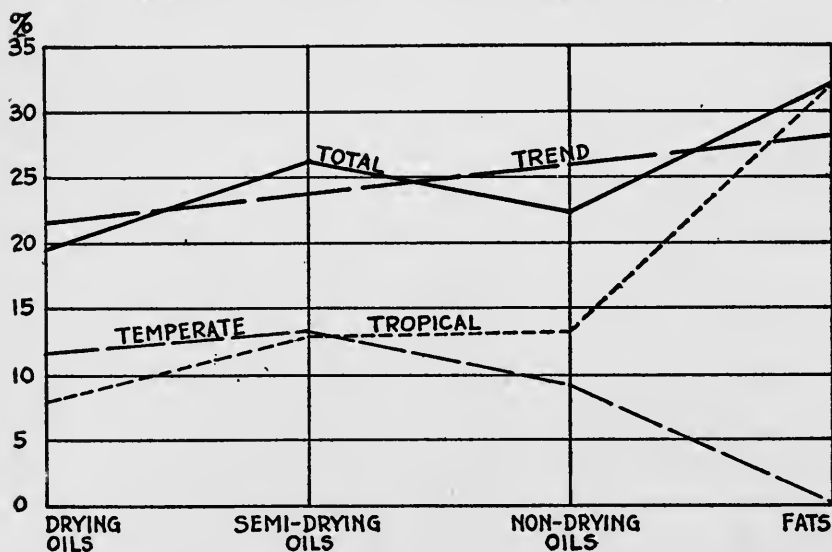
The percentages of drying, semi-drying, non-drying oils, and fats increase in plants growing in temperate habitats as follows: fats .03 per cent, non-drying oils 9.15 per cent, drying oils 11.63 per cent, and semi-drying oils 13.2 per cent.

Drying and semi-drying oils are therefore of more frequent occurrence in plants growing in temperate climates than in tropical plants.

OILS IN RELATION TO PLANT ORIGINS

As to a possible relation between the melting points of oils and tropical origin the following families with high melting-point oil are

CHARACTER OF OILS IN RELATION TO CLIMATE OF HABITAT



of interest (non-drying oils and fats): Cyperaceae, Palmae, Myristicaceae, Betulaceae, Ulmaceae, Olacaceae, Chenopodiaceae, Lardizabalaceae, Lauraceae, Moringaceae, Tropaeolaceae, Simarubaceae, Burseraceae, Meliaceae, Polygalaceae, Anacardiaceae, Hippocastanaceae, Sapindaceae, Vitaceae, Bombacaceae, Sterculiaceae, Ochnaceae, Caryocaraceae, Theaceae, Guttiferae, Dipterocarpaceae, Flacourtiaceae, Caricaceae, Rhizophoraceae, Combretaceae, Arali-

aceae, Sapotaceae, Oleaceae, Salvadoraceae, Loganiaceae, Asclepiadaceae, Verbenaceae, Bignoniaceae, Rubiaceae, Caprifoliaceae.

It is noted that the majority of these families are mainly tropical in their distribution, notable exceptions being Cyperaceae, Betulaceae, and Chenopodiaceae.

SUMMARY

There may be a relationship between the melting point of a fat or oil of a plant and the temperature of its environment. Such a relationship is known to exist in the case of oils of marine and terrestrial animals.

Oils are found in at least 83 (30 per cent) plant families out of 277 listed by Engler and Prantl.

Some 318 oils have been studied from these 83 families: 62 are drying, 83 are semi-drying, 71 are non-drying, and 102 are fats.

Oils found in seed coverings may have higher melting points than oils of seed kernels.

Waxes are found more abundantly on tropical plants than on plants of temperate climates.

There is close agreement between the oils of the different species of a genus.

The physical and chemical properties of oils may be more or less definitely correlated with specificity.

Tables of iodine numbers, saponification values, and specific gravities of over 300 oils are included. These may aid in differential analysis.

The oils of most of the smaller families are in close intrafamilial agreement, while those of the larger families are often in better agreement considered in tribal groups.

Tropical and subtropical plants are more likely to have fats and non-drying oils than semi-drying or drying oils, i.e., tropical and subtropical oils have higher melting points than the oils of temperate climates.

As to the possible relation between high melting-point oils and tropical origin a list of 40 families is given. Of this list three are mainly temperate in habitat.

SAPONIFICATION VALUES OF OILS, FATS AND WAXES

2.49	<i>Attalea funifera</i>	176.7	-186.6	<i>Ricinus communis</i>
46.76- 60.0	<i>Pedilanthus Pavonis</i>	176.8		<i>Ptychotis ajowan</i>
50.3 - 51.3	<i>Raphia Ruffa</i>	177.3		<i>Sinapis chinensis</i>
62.9 - 63.1	<i>Euphorbia antisyphlitica</i>	178.0	-183.0	<i>Hydnocarpus edulis</i>
63.0(?)	<i>Coriandrum sativum</i>	178.0	-185.1	<i>Pongamia glabra</i>
65.8	<i>Philadelphus coronarius</i>	178.0	-186.4	<i>Lepidium sativum</i>
78.4 - 88.3	<i>Corypha cerifera</i>	178.1		<i>Tilia americana</i>
101.51-162.0	<i>Linum usitatissimum</i>	178.1		<i>Apium graveolens</i>
113.0(?)	<i>Pyrus communis</i>	178.2		<i>Sinapis dissecta</i>
114.5	<i>Papaver somniferum</i>	178.22		<i>Mucuna urens</i>
140.0	<i>Euphorbia stenoclada</i>	178.3		<i>Carum Carvi</i>
142.8	<i>Euphorbia xylophylloides</i>	178.3	-178.4	<i>Pimpinella Anisum</i>
		178.4	-191.4	<i>Secale cornutum</i>
153.0 -191.0	<i>Myristica officinalis</i>	179.0	-205.7	<i>Stillingia sebifera</i>
156.2	<i>Picramnia carpinterae</i>	179.1	-192.6	<i>Aleurites moluccana</i>
157.0	<i>Acer platanoides</i>	179.3		<i>Cuminum Cyminum</i>
157.1	<i>Rhus laurina</i>	179.4		<i>Sinapis arvensis</i>
159.6	<i>Vohemaria Messeri</i>	179.4		<i>Daucus Carota</i>
165.1 -177.5	<i>Coffea arabica</i>	179.4	-193.5	<i>Oryza sativa</i>
165.58-191.6	<i>Pistacia vera</i>	179.5		<i>Crambe maritima</i>
166.2 -170.6	<i>Strychnos nux-vomica</i>	179.5		<i>Palaquium sp. (Surin fat)</i>
167.9	<i>Saccharum officinarum</i>			<i>Kickxia elastica</i>
168.5	<i>Fraxinus excelsior</i>	179.6		<i>Prunus Cerasus</i>
170.0(?)	<i>Laurus indica</i>	179.7	-197.8	<i>Acer Pseudo-platanus</i>
170.1(?)	<i>Sapindus rarak</i>	179.8		<i>Eriobotrya japonica</i>
170.14	<i>Ceiba pentandra</i>	179.9		<i>Barbarea praecox</i>
170.3 -177.8	<i>Sinapis alba</i>	180.0		<i>Cheiranthus Cheira</i>
170.4	<i>Eruca sativa</i>	180.3(?)		<i>Vicia sativa</i>
170.8	<i>Hyoscyamus niger</i>	180.5		<i>Lophira alata</i>
170.9	<i>Nasturtium Nasturtium-aquaticum</i>	180.7	-194.6	<i>Ceiba pentandra</i>
		181.0	-205.0	<i>Foeniculum officinale</i>
171.3(?)	<i>Ribes rubrum</i>	181.2		<i>Isatis tinctoria</i>
171.3 -180.1	<i>Brassica Napus</i>	181.2		<i>Trifolium incarnatum</i>
171.52	<i>Asclepias gigantea</i>	181.3		<i>Acanthosicyos horrida</i>
171.6	<i>Brassica campestris</i>	181.4		<i>Cydonia vulgaris</i>
171.8 -192.3	<i>Butyrospermum Parkii</i>	181.75-187.7		<i>Pentaclethra macrophylla</i>
172.1	<i>Brassica juncea</i>	181.9	-203.0	<i>Coriandrum sativum</i>
172.1	<i>Sorghum cernuum</i>			<i>Sinapis nigra</i>
172.26-175.3	<i>Brassica sp. (Jamba oil)</i>	182.0		<i>Olea europea var. sativa (seed)</i>
172.3	<i>Medicago sativa</i>	182.0	-190.0	<i>Prunus Armeniaca</i>
172.8	<i>Crataegus Oxyacantha</i>	182.3	-183.8	<i>Lens esculenta</i>
172.9 -178.5	<i>Brassica campestris</i>			<i>Amorpha fruticosa</i>
173.0 -183.1	<i>Ximenia americana</i>	182.3	-198.2	<i>Mimusops Djave</i>
173.4	<i>Armoracia rusticana</i>	182.4		<i>Cicer arietinum</i>
173.4 -212.01	<i>Sterculia foetida</i>	182.5		<i>Triticum sp.</i>
173.6	<i>Lecythis ollaria</i>	182.5	-188.6	<i>Tamarindus indica</i>
173.8 -181.6	<i>Raphanus sativus</i>	182.6		<i>Anthriscus Cerefolium</i>
174.0 -176.0	<i>Raphanus Raphanistrum</i>	182.8	-190.3	<i>Vicia sepium</i>
174.4	<i>Eruca sativa</i>	183.0		<i>Pithecoctenium echinatum</i>
174.4 -180.3	<i>Brassica oleracea</i>	183.1		<i>Trigonella Foenum-graecum</i>
174.5 -193.05	<i>Poga oleosa</i>	183.1		<i>Lycopersicum esculentum</i>
174.7 -178.9	<i>Brassica Rapa</i>	183.2		
175.1(?)	<i>Galega officinalis</i>			
175.2	<i>Onobrychis sativa</i>	183.4		
176.0	<i>Anethum graveolens</i>			
176.3	<i>Garcinia tonkinensis</i>	183.6	-192.0	
176.5	<i>Petroselinum sativum</i>			

183.8	<i>Setaria italica</i>	188.5	<i>Cephalotaxus drupacea</i>
184.0	<i>Phalaris canariensis</i>	188.5 -190.5	<i>Jessenia polycarpa</i>
184.1	<i>Voandzeia subterranea</i>	188.6	<i>Cupressus sempervirens</i>
184.5	<i>Pisum sativum</i>	188.6	<i>Linaria reticulata</i>
184.5	<i>Parkia africana</i>	188.6 -192.6	<i>Manihot Glaziovii</i>
184.5 -198.9	<i>Payena oleifera</i>	188.6 -195.3	<i>Couepia grandifolia</i>
184.6 -187.7	<i>Moringa oleifera</i>	188.7	<i>Phaseolus inamoenus</i>
184.7	<i>Vicia Faba</i>	188.7 -191.9	<i>Vateria indica</i>
184.7 -191.6	<i>Ricinodendron africanum</i>	188.7 -203.0	<i>Olea europea var. sativa</i> (pulp)
184.8	<i>Tilia parvifolia</i>	188.8	<i>Limonia Warneckei</i>
185.0	<i>Lallemantia iberica</i>	188.9 -192.2	<i>Guizotia abyssinica</i>
185.0	<i>Lupinus luteus</i>	189.3	<i>Pinus monophylla</i>
185.0	<i>Funtumia elastica</i>	189.0	<i>Anthyllis vulneraria</i>
185.0	<i>Sterculia appendiculata</i>	189.0 -196.8	<i>Papaver somniferum</i>
185.0	<i>Dialyanthera otoa</i>	189.2	<i>Phaseolus vulgaris var. albus</i>
185.1 -196.0	<i>Elaeococca vernicia</i>		<i>Parthenocissus quinquefolia</i>
185.3	<i>Ornithopus sativus</i>	189.2	
185.6	<i>Vigna Catjang</i>		
185.6 -196.9	<i>Melia Azadirachta</i>	189.2 -190.0	<i>Echinops ritro</i>
185.6 -197.0	<i>Arachis hypogaea</i>	189.1 -192.5	<i>Prunus Persica</i>
185.6 -206.1	<i>Hevea brasiliensis</i>	189.2	<i>Phaseolus lunatus</i>
185.8 -188.0	<i>Myagrurn sativum</i>	189.4	<i>Carthamnus Oxyacantha</i>
186.0 -194.6	<i>Bassia butyracea</i>	189.4	<i>Trifolium repens</i>
186.0 -202.0	<i>Datura Stramonium</i>	189.5	<i>Rubus fruticosus</i>
186.2	<i>Lupinus angustifolius</i>	189.5	<i>Trigonella Foenum-graecum</i>
186.5	<i>Canavalia ensiformis</i>		<i>Trifolium repens</i>
186.5 -197.5	<i>Joliffa africana</i>	189.5	<i>Bassia Mottleyana</i>
186.58	<i>Carica Papaya</i>	189.5 -191.5	<i>Prunus Amygdalus</i>
186.6 -191.7	<i>Stearodendron Stuhlmannii</i>	189.6	<i>Pinus montana</i>
		189.6	<i>Phaseolus coccineus</i>
186.6 -193.3	<i>Carthamnus tinctorius</i>	189.6	<i>Carya ovata</i>
186.7	<i>Thuja occidentalis</i>	189.7	<i>Coula edulis</i>
186.7 -202.9	<i>Citrullus Colocynthis</i>	189.7 -191.8	<i>Citrullus vulgaris</i>
186.8 -192.6	<i>Canarium pachyphyllum</i>	189.7 -192.3	<i>Amourea Rohituka</i>
186.8 -191.5	<i>Garcinia indica</i>	189.7 -192.6	<i>Zea Mays</i>
187.0 -192.0	<i>Cucumis Chate</i>	189.7 -200.2	<i>Canarium polyphyllum</i>
187.2	<i>Trifolium hybridum</i>	189.8	<i>Juglans Sieboldiana</i>
187.4 -188.5	<i>Bassia longifolia</i>	189.8	<i>Pinus sylvestris</i>
187.5	<i>Dolichos Lablab</i>	189.8 -192.0	<i>Aleurites cordata</i>
187.5	<i>Phaseolus Mungo</i>	189.9	<i>Trifolium pratense var. perenne</i>
187.6	<i>Manniophyton fulvum</i>		
187.8 -190.3	<i>Argemone mexicana</i>	189.9 -192.4	<i>Adansonia Grandidieri</i>
187.8 -195.8	<i>Luffa aegyptiaca</i>	190.0	<i>Nicotiana Tabacum</i>
187.9	<i>Melilotus albus</i>	190.0 -193.0	<i>Cannabis sativa</i>
187.9 -194.6	<i>Strophanthus hispidus</i>	190.1	<i>Vaccinum Vitis-idaea</i>
188.0	<i>Pinus cembra</i>	190.2 -192.7	<i>Linum usitatissimum</i>
188.0	<i>Diospyros virginiana</i>	190.3	<i>Omphalea megacarpa</i>
188.0	<i>Vicia Faba</i>	190.4	<i>Vaccinium Myrtilus</i>
188.0 -193.0	<i>Sesamum indicum</i>	190.5	<i>Cucumis Melo</i>
188.0 -194.0	<i>Helianthus annuus</i>	190.5	<i>Celosia cristata</i>
188.1	<i>Caryodendron orinocense</i>	190.5	<i>Pinus Picea</i>
188.1 -198.5	<i>Prunus domestica</i>	190.5	<i>Hedera Helix</i>
188.2	<i>Cajanus bicolor</i>	190.5 -191.7	<i>Adansonia digitata</i>
188.3	<i>Acrocomia sclerocarpa</i>	190.6	<i>Caragana arborescens</i>
188.3 -195.5	<i>Thea sasangua</i>	190.6 -192.5	<i>Glycine hispida</i>
188.3 -196.2	<i>Bassia villosa</i>	190.7	<i>Lotus corniculatus</i>
188.4	<i>Torreya nucifera</i>	190.8 -193.8	<i>Rhus glabra</i>
188.4	<i>Citrus Limonia</i>	190.9	<i>Petroselinum sativum</i>
188.4	<i>Melampyrum arvense</i>	190.9 -193.4	<i>Perilla nankinensis</i>
188.4	<i>Trifolium agrarium</i>		
188.4 -190.2	<i>Cucurbita Pepo</i>		

191.0	Calophyllum inophyl- lum	194.15	Sterculia chica
191.0	Cannabis sativa	194.5	Nigella sativa
191.0 -192.0	Ungnadia speciosa	194.5	Aesculus Hippocastanum
191.0 -194.5	Gossypium sp. (cotton)	194.6	Gynandropsis penta- phylla
191.1	Lactuca Scariola var. oleifera	194.6	Moronobea coccinea
191.1 -196.3	Fagus sylvatica	194.6	Bhigia sapida
191.2	Shorea aptera	194.74	Garcinia morella
191.3	Torreya californica	194.9 -197.1	Cucurbita maxima
191.3	Pinus Gerardiana	195.0	Anacardium occidentale
191.3	Morus alba	195.0	Lycopodium
191.5	Melia Azedarach	195.2	Oenothera biennis
191.5	Cucurbita maxima	195.2	Citrus aurantifolia
191.5 -195.2	Ricinusdendron Rauta- nenii	195.2 -196.9	Abelmoschus esculentus
191.8	Pinus Cembra	195.5	Cucumis sativus
191.8	Hesperis matronalis	195.5	Vitis vinifera
191.8 -202.0	Theobroma Cacao	195.6 -197.2	Carapa guianensis
191.9	Thea japonica	195.7 -196.2	Cucurbita Pepo
191.9	Thea sinensis	195.98	Citrus Limonia
192.0	Pentadesma Kerstingii	196.0	Citrus Limonia
192.0	Chisocheton Cumingianus	196.0	Secale cereale
192.0	Plukenetia conophora	196.3 -205.5	Elaeis guineensis
192.0	Maclura pomifera	196.42	Calotropis gigantea
192.0	Pinus Abies	196.5	Daphne Cnidium
192.0 -192.5	Cornus sanguinea	196.5	Moquilea tomentosa
192.12	Argania sideroxyylon	196.5 -197.2	Astrocaryum vulgare
192.3	Rubus idaeus	196.6	Lappa minor
192.4	Robinia Pseudoacacia	196.8 -209.3	Sambucus racemosa
192.4	Oncoba echinata	197.0	Gynocardia odorata
192.6	Cytisus Laburnum	197.0	Canarium oleosum
192.6	Pinus Pineae	197.0	Canarium luzonicum
192.7	Picramnia Lindeniana	197.0 -210.0	Pentadesma butyracea
192.8	Madia sativa	197.1	Laurus nobilis
192.8	Pinus monophylla	197.25	Martynia louisiana
192.8	Lupinus albus	197.6	Basiloxylon brasiliensis
192.8 -197.1	Pinus monophylla	197.6	Hodgsonia Kadam
192.9 -215.6	Croton Tiglium	197.6 -199.5	Caryocar butyrosom
193.0	Parthenocissus quinque- folia	198.0	Carya Pecan
193.0	Bryonia dioica	198.0	Trichilia emetica
193.2	Jatropha Curcas	198.1	Carapa grandiflora
193.4	Medicago sativa	198.2	Citrullus vulgaris
193.4	Illicium religiosum	198.4	Datura Metel
193.4	Echinocystis oregana	198.5	Skaphium lanceatum
193.4 -194.1	Asparagus officinalis	198.5	Xanthophyllum lancea- tum
193.4 -202.0	Bertholletia excelsa	198.6	Spartium junceum
193.48	Perilla frutescens	199.3	Quercus agrifolia
193.5 -194.3	Colophonina mauritiana	199.5	Aegiphila obducta
193.6	Buchanania latifolia	199.8	Myrtus communis
193.7	Fragaria vesca	200.3 -213.0	Hydnocarpus Kurzii
193.7 -196.37	Citrus Aurantium	201.5	Croton Elliotianus
193.8 -197.3	Juglans regia	201.5	Palaquium oblongi- folium
193.8	Illicium verum	201.5	Trichilia subcordata
193.8	Polygala Senega	202.0 -203.0	Nerium Oleander
193.8	Nephelium lappaceum	202.0	Pyrus Malus
193.9	Thea sasanqua	202.8	Vernonia anthelmintica
194.0	Prunus Laurocerasus	203.0	Hyptis spicigera
194.0	Jatropha mahafalensis	203.0 -204.0	Terminalia Catappa
194.0 -196.5	Citrullus vulgaris	203.1	Citrullus Naudinianus
194.1	Balanites aegyptiaca	203.5 -208.1	Hydnocarpus Wightiana
		203.6	Trichilia emetica
		203.7 -205.8	Mesua ferrea

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203.8	-210.4	<i>Stillingia sebifera</i>	239.5	-240.2	<i>Myristica platysperma</i>
205.0		<i>Magnolia hypoleuca</i>	241.2	-250.0	<i>Irvingia</i> spp.
205.7	-217.0	<i>Myricacerifera</i>	241.39		<i>Machilus Thunbergii</i>
205.9		<i>Pithecolobium dulce</i>	242.2		<i>Allophylus racemosa</i>
206.2	-212.0	<i>Hydnocarpus anthe-</i> <i>lenticus</i>	242.36		<i>Salvadora oleoides</i>
208.0		<i>Sorbus Aucuparia</i>	242.5	-243.3	<i>Astrocaryum vulgare</i>
208.0		<i>Arbutus Unedo</i>	244.0		<i>Myristica surinamensis</i>
209.2		<i>Oenocarpus distichus</i>	244.7		<i>Litsea zeylanica</i>
210.98		<i>Phoenix dactylifera</i>	245.2		<i>Salvadora persica</i>
211.0		<i>Betula alba</i>	246.2	-250.0	<i>Mauritia vinifera</i>
213.9		<i>Mimusops elengi</i>	246.3		<i>Elaeis guineensis</i>
215.02		<i>Myristica canarica</i>	246.4		<i>Akebia quinata</i>
215.3	-227.0	<i>Schleichera trijuga</i>	251.0		<i>Polygala butyracea</i>
216.2		<i>Chorisia Peckoltiana</i>	251.0	-268.4	<i>Cocos nucifera</i>
217.5	-237.5	<i>Rhus sylvestris</i>	252.4	-256.5	<i>Attalea cohune</i>
218.8	-220.3	<i>Virola bicuhyba</i>	255.0		<i>Myristica angolensis</i>
220.6		<i>Rhus diversiloba</i>	255.6	-349.0	<i>Lindera sericea</i>
221.5		<i>Virola guatemalensis</i>	262.2		<i>Attalea excelsa</i>
223.5(?)		<i>Celastrus senegalensis</i>	262.2		<i>Telfairia occidentalis</i>
224.4		<i>Magnolia hypoleuca</i>	268.2		<i>Lepidadenia Wightiana</i>
224.72		<i>Cyperus esculentus</i>	270.0(?)		<i>Capsicum annum</i>
227.4	-234.6	<i>Areca catechu</i>	273.6		<i>Lindera praecox</i>
229.2		<i>Luffa acutangula</i>	277.3		<i>Ulmus campestris</i>
234.8		<i>Apeiba</i> sp.	280.0		<i>Hordeum vulgare</i>
235.0	-235.6	<i>Irvingia Oliveri</i>	282.0		<i>Lindera triloba</i>
238.5		<i>Scyphocephalum</i> <i>ochocoa</i>	283.8		<i>Cinnamomum Cam-</i> <i>phora</i>
			339.6(?)		<i>Citrus aurantifolia</i>

SPECIFIC GRAVITY OF OILS, FATS AND WAXES AT 15° C.

0.832	-0.836	<i>Raphia Ruffa</i>	.9137-	.9167	<i>Mimusops Djave</i>
.8594-	.9177	<i>Butyrospermum Parkii</i>	.9143		<i>Citrullus vulgaris</i>
.865		<i>Mucuna urens</i>	.9147		<i>Canarium polyphyllum</i>
.866		<i>Polygala butyracea</i>	.9148		<i>Brassica campestris</i>
.867		<i>Salvadora persica</i>	.9149		<i>Melia Azadirachta</i>
.868		<i>Attalea funifera</i>	.915	-.921	<i>Jatropha Curcas</i>
.868	-.871	<i>Attalea cohune</i>	.915		<i>Adansonia digitata</i>
.8686		<i>Attalea excelsa</i>	.915		<i>Vateria indica</i>
.8715		<i>Virola bicuhyba</i>	.915	-.918	<i>Stillingia sebifera</i>
.8916		<i>Lepidadenia Wightiana</i>	.915	-.9158	<i>Brassica</i> sp. (Jamba oil)
.8943-	.9175	<i>Bassia villosa</i>	.9155-	.917	<i>Corylus Avellana</i>
.895(?)		<i>Lecythis ollaria</i>	.9156		<i>Caryocarp tomentosum</i>
.898		<i>Oncoba echinata</i>	.9158		<i>Brassica juncea</i>
.9002		<i>Luffa acutangula</i>	.9158		<i>Blighia sapida</i>
.9011		<i>Rhus laurina</i>	.9158		<i>Trichilia emetica</i>
.9072		<i>Torreya californica</i>	.9158-	.9558	<i>Bassia butyracea</i>
.9072-	.9171	<i>Sambucus racemosa</i>	.916	-.9196	<i>Olea europea</i> var. <i>sativa</i>
.9083-	.998	<i>Linum usitatissimum</i>	.916		<i>Astrocaryum vulgare</i>
.9092-	.9285	<i>Prunus Cerasus</i>	.916		<i>Thea japonica</i>
.9099-	.9225	<i>Fagus sylvatica</i>	.916	-.9213	<i>Prunus domestica</i>
.9119		<i>Elaeis guineensis</i>	.9161		<i>Jessenia polycarpa</i>
.912		<i>Carapa guianensis</i>	.9162		<i>Quercus agrifolia</i>
.912		<i>Ribes rubrum</i>	.9163		<i>Thea sasanqua</i>
.9125		<i>Picramnia Lindeniana</i>	.9164		<i>Pentaclethra macro-</i> <i>phylla</i>
.9126-	.916	<i>Sinapis alba</i>			<i>Arachis hypogaea</i>
.9127-	.920	<i>Moringa oleifera</i>	.9165-	.920	<i>Raphanus sativus</i>
.9127-		<i>Garcinia tonkinensis</i>	.9165-	.9178	<i>Ximenia americana</i>
.9127		<i>Garcinia indica</i>	.9165-	.9248	<i>Canavalia ensiformis</i>
.9128-	.9225	<i>Canarium commune</i>	.9169		<i>Trifolium incarnatum</i>
.9137		<i>Sorbus Aucuparia</i>	.917		

.917	<i>Trifolium repens</i>	.922	<i>Cydonia vulgaris</i>
.917 - .920	<i>Brassica Rapa</i>	.9221	<i>Sinapis dissecta</i>
.917	<i>Bassia Mottleyana</i>	.9222- .9279	<i>Glycine hispida</i>
.917 - .927	<i>Thea sasanqua</i>	.9224- .926	<i>Myagrum sativum</i>
.9172	<i>Canarium pachyphyllum</i>	.9225	<i>Datura Metel</i>
.9172- .921	<i>Brassica Napus</i>	.9226	<i>Strychnos Nux-vomica</i>
.9175	<i>Vicia Faba</i>	.9228	<i>Sinapis arvensis</i>
.9175- .9186	<i>Raphanus Raphanistrum</i>	.923	<i>Sinapis chinensis</i>
.9175- .921	<i>Brassica campestris</i>	.923	<i>Anthyllis vulneraria</i>
.9175- .923	<i>Datura Stramonium</i>	.923 - .926	<i>Sesamum indicum</i>
.9176	<i>Voandzeia subterranea</i>	.923 - .924	<i>Cucumis sativus</i>
.9177	<i>Eruca sativa</i>	.923	<i>Prunus Laurocerasus</i>
.9177- .9195	<i>Prunus Amygdalus</i>	.923 - .925	<i>Cucurbita Pepo</i>
.9178	<i>Thea sinensis</i>	.923 - .925	<i>Gossypium sp. (cotton)</i>
.9179	<i>Phaseolus vulgaris var. albus</i>	.9232	<i>Armoracia rusticana</i>
.918	<i>Bertholletia excelsa</i>	.9232	<i>Pimpinella Anisum</i>
.918 - .9185	<i>Telfairia pedata</i>	.9232	<i>Nicotiana Tabacum</i>
.918 - .9215	<i>Prunus Persica</i>	.9235	<i>Lupinus angustifolius</i>
.9184	<i>Carya Pecan</i>	.9235	<i>Lupinus luteus</i>
.9184	<i>Cicer arietinum</i>	.9235	<i>Lupinus albus</i>
.9184- .9191	<i>Olea europea var. sativa</i>	.9235	<i>Melia Azedarach</i>
.9184- .922	<i>Citrullus vulgaris</i>	.9235- .9236	<i>Ceiba pentandra</i>
.9185- .9188	<i>Pistacia vera</i>	.9236	<i>Apium graveolens</i>
.9186	<i>Coula edulis</i>	.9237	<i>Daphne Cnidium</i>
.9187	<i>Adansonia Grandidieri</i>	.9238	<i>Torreya nucifera</i>
.9187	<i>Crambe maritima</i>	.9238- .9258	<i>Manihot Glaziovii</i>
.919	<i>Hodgsonia Kadam</i>	.9239- .9302	<i>Vicia sativa</i>
.919 - .923	<i>Sinapis nigra</i>	.924	<i>Hevea brasiliensis</i>
.919 - .926	<i>Cucurbita maxima</i>	.924	<i>Pimpinella Anisum</i>
.9191	<i>Chelidonium majus</i>	.924	<i>Cheiranthus Cheira</i>
.9191- .9219	<i>Lophira alata</i>	.924	<i>Cucumis Chate</i>
.9192- .9256	<i>Trichilia emetica</i>	.924 - .926	<i>Schleichera trijuga</i>
.9193	<i>Pisum sativum</i>	.924 - .927	<i>Helianthus annuus</i>
.9195(?)	<i>Rhamnus cathartica</i>	.924 - .927	<i>Papaver somniferum</i>
.9198	<i>Phaseolus coccineus</i>	.9241	<i>Viola guatemalensis</i>
.9198	<i>Eruca sativa</i>	.9243	<i>Petroselinum sativum</i>
.9198- .9226	<i>Brassica oleracea</i>	.9244	<i>Diospyros virginiana</i>
.920	<i>Diallyanthus otoba</i>	.9244	<i>Myrtus communis</i>
.920 - .9238	<i>Lepidium sativum</i>	.9245	<i>Delphinium elatum</i>
.920 - .926	<i>Aleurites moluccana</i>	.9245	<i>Morus alba</i>
.920	<i>Balanites aegyptiaca</i>	.9245- .9374	<i>Triticum sp. (wheat)</i>
.9203	<i>Chisocheton Cumingianus</i>	.9247- .9259	<i>Argemone mexicana</i>
.9204	<i>Prunus Armeniaca</i>	.9248	<i>Juglans Sieboldiana</i>
.9205	<i>Nasturtium Nasturtium-aquaticum</i>	.9248	<i>Nigella sativa</i>
.9206	<i>Mauritia vinifera</i>	.9248- .9263	<i>Guizotia abyssinica</i>
.9208	<i>Lens esculenta</i>	.9249	<i>Cucurbita maxima</i>
.9208	<i>Arbutus Unedo</i>	.9249	<i>Strophanthus hispidus</i>
.9209- .9245	<i>Elaeis guineensis</i>	.925	<i>Cephalotaxus drupacea</i>
.921 - .9225	<i>Cornus sanguinea</i>	.925	<i>Myristica surinamensis</i>
.921 - .926	<i>Luffa aegyptiaca</i>	.925	<i>Trifolium hybridum</i>
.9212	<i>Medicago sativa</i>	.925 - .927	<i>Secale cornutum</i>
.9213	<i>Jatropha mahafalensis</i>	.925 - .931	<i>Cannabis sativa</i>
.9214	<i>Barbarea praecox</i>	.9251	<i>Isatis tinctoria</i>
.9214	<i>Scyphocephalum ochocoa</i>	.9252	<i>Linaria reticulata</i>
.9215	<i>Ornithopus sativus</i>	.9255	<i>Payena oleifera</i>
.9215- .922	<i>Zea Mays</i>	.9256	<i>Cuminum Cyminum</i>
.9219	<i>Citrullus vulgaris</i>	.9256	<i>Rubus fruticosus</i>
.922	<i>Onobrychis sativa</i>	.9256- .9265	<i>Juglans regia</i>
		.9257- .9259	<i>Rhus glabra</i>
		.9259	<i>Cocos nucifera</i>
		.926	<i>Laurus indica</i>
		.926	<i>Aesculus Hippocastanum</i>

.926 - .928	Cucurbita Pepo	.9337	Cinnamomum Camphora
.9262	Dolichos Lablab		Perilla frutescens
.9264	Illicium verum	.9342	Fragaria vesca
.9265	Garcinia morella	.9345	Carapa grandiflora
.9265	Anthriscus Cerefolium	.9346	Trigonella Foenum-graecum
.9266	Croton Elliotianus	.935	Anethum graveolens
.9267	Ptychotis ajowan		Ricinodendron africanum
.9267- .9277	Carthamnus tinctorius	.9352	Plukenetia conophora
.9268	Carum Carvi	.9355- .9382	Aleurites cordata
.9268	Cajanus bicolor	.936	Pedilanthus Pavonis
.9268	Pinus Picea	.936 - .993	Pongamia glabra
.9269	Arctium Lappa	.937	Lotus corniculatus
.927	Pentadesma butyracea	.937 - .939	Perilla nankinensis
.9275	Apeiba	.9371	Lallemantia iberica
.9275	Setaria italica	.938	Tilia americana
.9276	Cucumis Melo	.938	Melilotus albus
.9276	Phaseolus inamoenus	.938	Telfairia occidentalis
.928	Asparagus officinalis	.939	Hyoscyamus niger
.928	Galega officinalis	.939	Euonymus europaea
.9281	Cajanus bicolor	.9403	Allophylus racemosa
.9282	Phaseolus lunatus	.9406	Crataegus Oxyacantha
.9282	Sorghum cernuum	.9417	Machilus Thunbergii
.9283	Oenothera biennis	.9426	Amorpha fruticosa
.9284	Coriandrum sativum	.9435	Celastrus senegalensis
.9285- .9286	Madia sativa	.9437	Croton Tiglium
.9286	Ricinodendron Rautanenii	.9437	Symphonia globulifera
.9288- .932	Echinops ritro	.945 - .996	Myristica officinalis
.9289	Citrullus Colocynthis	.9458	Stillingia sebifera
.929	Sterculia foetida	.9458	Myristica angolensis
.929	Funtunia elastica	.9468	Dipteryx odorata
.929	Trifolium agrarium	.9471	Trigonella Foenum-graecum
.929	Medicago sativa		Litsea zeylanica
.9295	Illicium religiosum	.9492	Oryza sativa
.9295	Tilia pravifolia	.9495	.951 - .9525
.9296	Daucus Carota	.9518	Coffea arabica
.9298	Stearodendron Stuhlmannii	.953	Bassia longifolia
.9298	Vigna Catjang	.9577	Buchanania latifolia
.930	Pinus Cembra	.958	Vicia Faba
.9301	Vaccinium Vitis-idaea	.959 - .960	Hydnocarpus Kurzii
.9304	Foeniculum officinale		Hydnocarpus anthelmintica
.9307	Pinus Gerardiana	.9591- .9679	Ricinus communis
.9315	Irvingia spp.	.9594	Ulmus campestris
.9315- .9335	Hesperis matronalis	.9625	Euonymus verrucosa
.931 - .9386	Amora Rohituka	.9637	Polygala Senega
.9316	Pinus Cembra	.964 - .976	Theobroma Cacao
.9316- .941	Linum usitatissimum	.965	Hydnocarpus Wightianus
.9317	Rubus idaeus		Aegiphila obducta
.9318	Pinus montana	.9656	Triticum spp. (wheat)
.932	Gynocardia odorata	.9656	Eriobotrya japonica
.9326	Pinus sylvestris	.967	Saccharum officinarum
.9327	Kickxia elastica	.968	Couepia grandifolia
.9328	Dialyanthera otoba	.9694	Pithecolobium dulce
.9329	Salvadora oleoides	.9697- .986	Euphorbia antisiphilitica
.933	Pinus monophylla		Mimosa elengi
.933 - .935	Elaeococca vernicia	.9717	Rhus succedanea
.9331	Vaccinium Myrtilus	.975	Ongokea Klaineana
.9332- .953	Laurus nobilis	.9786	
.9336	Palaquium sp.		
.9336	Phaseolus Mungo		

.988	<i>Argania Sideroxyylon</i>	1.4718	<i>Pinus monophylla</i>
.9896	<i>Rhus diversiloba</i>	1.4737	<i>Anacardium occidentale</i>
.990 - .999	<i>Corypha cerifera</i>	1.486	<i>Pinus Pinea</i>
.995	<i>Virola sebifera</i>	1.4869	<i>Picramnia carpinterae</i>
.995	<i>Myrica cerifera</i>	1.4935	<i>Thuja occidentalis</i>
1.0115	<i>Ficus cerifuta</i>	1.4997	<i>Cupressus sempervirens</i>
1.019	<i>Cannabis sativa</i>		

IODINE NUMBERS OF OILS, FATS AND WAXES

1.03- 3.9	<i>Myrica cerifera</i>	38.4	<i>Nephelium lappaceum</i>
1.72	<i>Scyphocephalum ochocoa</i>	39.4	<i>Allophylus racemosa</i>
		39.9	<i>Trichilia subcordata</i>
2.28- 11.54	<i>Lepidadenia Wightiana</i>	40.1	<i>Luffa acutangula</i>
3.2	<i>Vohemaria Messeri</i>	40.1 - 85.7	<i>Myristica officinalis</i>
3.34- 5.2	<i>Irvingia spp.</i>	41.2 - 46.5	<i>Bassia butyracea</i>
3.6 - 17.35	<i>Attalea excelsa</i>	41.85- 49.5	<i>Caryocar tomentosum</i>
4.2 - 15.1	<i>Rhus sylvestris</i>	41.9	<i>Stearodendron Stuhlmannii</i>
4.5	<i>Cinnamomum Camphora</i>	42.3	<i>Pentadesma butyracea</i>
4.98- 6.3	<i>Myristica platysperma</i>	42.31	<i>Palaquium spp.</i>
5.3	<i>Euphorbia xylophylloides</i>	43.4	<i>Telfairia occidentalis</i>
		44.0	<i>Trichilia emetica</i>
5.9	<i>Euphorbia stenoclada</i>	45.9	<i>Pentadesma Kerstingii</i>
5.9	<i>Salvadora persica</i>	46.5	<i>Litsea zeylanica</i>
6.7 - 6.8	<i>Irvingia Oliveri</i>	48.3 - 69.1	<i>Schleichera trijuga</i>
7.48	<i>Salvadora oleoides</i>	48.7	<i>Eriobotrya japonica</i>
7.7 - 10.7	<i>Raphia Ruffa</i>	49.1	<i>Blighia sapida</i>
8.0 - 10.0	<i>Cocos nucifera</i>	50.1 - 64.0	<i>Bassia longifolia</i>
8.79	<i>Rhus diversiloba</i>	50.7	<i>Carica Papaya</i>
9.5 - 18.5	<i>Virola bicubyba</i>	50.7	<i>Pithecoctenium echinatum</i>
9.61- 17.0	<i>Linum usitatissimum</i>		
10.3 - 17.5	<i>Elaeis guineensis</i>	52.0	<i>Philadelphus coronarius</i>
10.4 - 11.2	<i>Astrocaryum vulgare</i>	52.31	<i>Phoenix dactylifera</i>
11.0 - 13.7	<i>Attalea cohune</i>	52.5	<i>Polygala butyracea</i>
11.44	<i>Rhus laurina</i>	52.6 - 67.85	<i>Bassia latifolia</i>
11.68	<i>Lindera triloba</i>	52.95- 59.74	<i>Canarium polyphyllum</i>
12.3 - 24.3	<i>Areca catechu</i>	53.0 - 57.44	<i>Elaeis guineensis</i>
12.4	<i>Virola guatemalensis</i>	53.9 - 66.0	<i>Adansonia Grandidieri</i>
13.2 - 13.5	<i>Corypha cerifera</i>	54.0	<i>Dialyanthera otoba</i>
13.8	<i>Myristica surinamensis</i>	54.0 - 67.2	<i>Butyrospermum Parkii</i>
14.0 - 20.0	<i>Pedilanthus Pavonis</i>	55.0	<i>Oenocarpus distichus</i>
15.0	<i>Shorea aptera</i>	55.46	<i>Garcinia morella</i>
15.6	<i>Attalea funifera</i>	56.0 - 57.2	<i>Mimusops Djave</i>
19.0 - 37.7	<i>Stillingia sebifera</i>	56.6	<i>Pithecolobium dulce</i>
20.53	<i>Lindera praecox</i>	56.8	<i>Picramnia Lindeniana</i>
22.6	<i>Cannabis sativa</i>	57.1	<i>Canarium luzonicum</i>
25.0 - 34.2	<i>Garcinia indica</i>	57.3	<i>Buchanania latifolia</i>
25.2	<i>Mauritia vinifera</i>	57.65	<i>Paullinia trigona</i>
26.64	<i>Myristica canarica</i>	58.5 - 72.1	<i>Carapa guianensis</i>
26.9	<i>Acrocomia sclerocarpa</i>	58.62- 63.4	<i>Payena oleifera</i>
32.3	<i>Ulmus campestris</i>	59.61- 61.25	<i>Canarium pachyphyllum</i>
32.8 - 41.7	<i>Theobroma Cacao</i>	60.0	<i>Saccharum officinarum</i>
33.42	<i>Gossypium spp.</i>	60.25	<i>Melia Champaca</i>
34.3	<i>Palaquium oblongifolium</i>	61.4	<i>Chorisia Peckoltiana</i>
		61.6	<i>Trifolium incarnatum</i>
35.06- 57.6	<i>Euphorbia antisyphilitica</i>	61.6	<i>Lupinus albus</i>
		61.8	<i>Galega officinalis</i>
36.6	<i>Xanthophyllum lanceatum</i>	62.3	<i>Cyperus esculentus</i>
		63.0	<i>Canarium oleosum</i>
36.6	<i>Skaphium lanceatum</i>	63.2 - 65.0	<i>Bassia Mottleyana</i>
37.82- 39.63	<i>Vateria indica</i>	63.9	<i>Picramnia carpinterae</i>

64.15	<i>Aegiphila obducta</i>	82.5 - 90.8	<i>Hydnocarpus antheleminticus</i>
64.2	<i>Symphonia globulifera</i>		
64.7 - 65.6	<i>Canarium commune</i>	83.2	<i>Lupinus angustifolius</i>
65.0	<i>Trichilia emetica</i>	83.3 -105.0	<i>Arachis hypogaea</i>
65.1	<i>Sapindus rarak</i>	83.36	<i>Coula edulis</i>
65.29	<i>Lindera sericea</i>	83.6	<i>Betula alba</i>
65.4	<i>Myristica angolensis</i>	83.61- 87.8	<i>Pistacia vera</i>
65.9	<i>Trifolium hybridum</i>	83.65-179.5	<i>Couepia grandifolia</i>
66.0 - 80.5	<i>Laurus nobilis</i>	83.7	<i>Carapa grandiflora</i>
66.0 - 96.0	<i>Hodgsonia Kadam</i>	83.9 - 90.2	<i>Corylus Avellana</i>
66.08	<i>Machilus Thunbergii</i>	84.0	<i>Anacardium occidentale</i>
66.5	<i>Mimusops elengi</i>		
67.7	<i>Onobrychis sativa</i>	84.2 -100.7	<i>Joliffa africana</i>
68.3	<i>Lupinus luteus</i>	84.27	<i>Calotropis gigantea</i>
68.5	<i>Trifolium repens</i>	84.5	<i>Capsicum annum</i>
69.0	<i>Ornithopus sativus</i>	85.24-129.0	<i>Eriodendron anfractuosum</i>
69.4 - 79.3	<i>Strychnos Nux-vomica</i>		
69.44	<i>Ceiba pentandra</i>	85.4	<i>Dryopteris Filix-mas</i>
69.6 - 72.9	<i>Melia Azadirachta</i>	85.7 - 99.5	<i>Pentaclethra macrophylla</i>
69.8 - 72.5	<i>Lophira alata</i>		
70.0	<i>Lotus corniculatus</i>	85.89- 91.2	<i>Coffea arabica</i>
70.52	<i>Asclepias gigantea</i>	86.0	<i>Calophyllum inophyllum</i>
71.0	<i>Vernonia anthemintica</i>	86.1	<i>Canavalia ensiformis</i>
71.1 - 74.5	<i>Secale cornutum</i>	86.2	<i>Garcinia tonkinensis</i>
71.4	<i>Melilotus albus</i>	86.7	<i>Celastrus senegalensis</i>
71.6	<i>Anthyllis vulneraria</i>	86.99- 87.8	<i>Olea europea var. sativa</i>
71.64	<i>Lecythis ollaria</i>	87.1	<i>Tamarindus indica</i>
72.2 -112.6	<i>Moringa oleifera</i>	88.0	<i>Nerium Oleander</i>
73.02-101.6	<i>Strophanthus hispidus</i>	88.0 - 90.49	<i>Thea sasanqua</i>
73.4	<i>Jessenia polycarpa</i>	88.3	<i>Coriandrum sativum</i>
73.75	<i>Tropaeolum majus</i>	88.5 -102.5	<i>Hydnocarpus Wightianus</i>
74.3 - 75.7	<i>Astrocaryum vulgare</i>	88.7 - 89.1	<i>Mesua ferrea</i>
75.2	<i>Limonia Warneckei</i>	88.7 -133.4	<i>Cucurbita maxima</i>
75.9	<i>Trifolium agrarium</i>	89.53	<i>Magnolia hypoleuca</i>
76.14- 87.0	<i>Sterculia foetida</i>	89.9	<i>Caesalpinia Bonducella</i>
76.4	<i>Basiloxylon brasiliensis</i>	89.7 - 93.3	<i>Poga oleosa</i>
76.7 - 77.8	<i>Adansonia digitata</i>	89.94	<i>Hydnocarpus edulis</i>
77.28- 91.7	<i>Olea europea var. sativa</i>	90.0	<i>Parthenocissus quinquefolia</i>
77.3 - 94.0	<i>Pongamia glabra</i>		
77.9	<i>Apeiba sp.</i>	90.0	<i>Hordeum vulgare</i>
78.38	<i>Akebia quinata</i>	90.4 -108.7	<i>Prunus Armeniaca</i>
78.4 - 81.8	<i>Polygala Senega</i>	90.4 -104.4	<i>Hydnocarpus Kurzii</i>
78.9	<i>Sterculia chica</i>	90.42	<i>Thea sinensis</i>
78.9	<i>Medicago sativa</i>	90.6	<i>Illicium religiosum</i>
80.0 - 85.0	<i>Ximenia americana</i>	91.2 -104.0	<i>Prunus domestica</i>
80.1	<i>Petroselinum sativum</i>	91.6	<i>Parkia africana</i>
80.4	<i>Thea japonica</i>	91.65-107.0	<i>Oryza sativa</i>
80.78	<i>Chisocheton Cumingianus</i>	91.8	<i>Hedera Helix</i>
		91.8	<i>Cuminum Cyminum</i>
81.0	<i>Lycopodium</i>	92.1 - 97.68	<i>Sinapis alba</i>
81.4 - 90.6	<i>Ricinus communis</i>	92.5 -109.7	<i>Prunus Persica</i>
81.44-110.6	<i>Sambucus racemosa</i>	92.7	<i>Crambe maritima</i>
81.5	<i>Moquilea tomentosa</i>	92.8 -122.6	<i>Prunus Cerasus</i>
81.5 - 82.0	<i>Ungnadia speciosa</i>	92.85-112.4	<i>Raphanus sativus</i>
81.8	<i>Terminalia Catappa</i>	93.0	<i>Acer Pseudo-platanus</i>
81.88	<i>Secale cereale</i>	93.0 -101.26	<i>Prunus Amygdalus</i>
81.9	<i>Trigonella Foenugraecum</i>	93.1	<i>Illicium verum</i>
		93.6 -101.9	<i>Brassica oleracea</i>
82.0	<i>Vicia Faba</i>	94.4	<i>Dolichos Lablab</i>
82.3	<i>Thea sasanqua</i>	94.7	<i>Torreya californica</i>
82.4	<i>Sterculia appendiculata</i>	94.8	<i>Apium graveolens</i>

95.2	<i>Abelmoschus esculentus</i>	109.2	<i>Citrus Limonia</i>
95.2 -103.5	<i>Brassica</i> sp. (Jamba oil)	109.2	<i>Magnolia hypoleuca</i>
95.3 -104.6	<i>Brassic Napus</i>	109.5	<i>Petroselinum sativum</i>
95.4	<i>Aesculus Hippocastanum</i>	110.2	<i>Anthriscus Cerefolium</i>
		111.0	<i>Tilia americana</i>
95.94	<i>Argania Sideroxylo</i>	111.0	<i>Vicia sepium</i>
96.1 -112.5	<i>Triticum</i> sp.	111.2 -120.1	<i>Fagus sylvatica</i>
96.4 -100.0	<i>Brassica Rapa</i>	111.3	<i>Phaseolus Mungo</i>
97.26-104.0	<i>Citrus Aurantium</i>	111.8	<i>Jatropha mahajalensis</i>
98.3 -104.9	<i>Jatropha Curcas</i>	111.8	<i>Isatis tinctoria</i>
98.3 -106.2	<i>Bertholletia excelsa</i>	112.0	<i>Voandezia subterranea</i>
98.6	<i>Nasturtium Nasturtium-aquaticum</i>	113.0 -113.2	<i>Datura Stramonium</i>
		113.0 -120.2	<i>Cydonia vulgaris</i>
98.89	<i>Sorghum cernuum</i>	113.5 -126.0	<i>Sinapis nigra</i>
99.0	<i>Foeniculum officinale</i>	115.2 -115.6	<i>Triticum</i> sp.
99.2	<i>Brassica campestris</i>	115.5	<i>Phalaris canariensis</i>
99.6	<i>Vicia Faba</i>	116.2	<i>Datura Metel</i>
99.7	<i>Oncoba echinata</i>	116.5	<i>Echinocystis oregana</i>
99.72	<i>Eruca sativa</i>	116.6	<i>Acanthosicyos horrida</i>
99.8	<i>Coriandrum sativum</i>	116.8	<i>Diospyros virginiana</i>
99.8	<i>Phaseolus lunatus</i>	117.0 -128.5	<i>Cucumis Chate</i>
100.0	<i>Acer platanoides</i>	117.1 -121.8	<i>Citrullus vulgaris</i>
100.0 -101.0	<i>Cornus sanguinea</i>	117.5 -119.5	<i>Madia sativa</i>
100.4	<i>Lens esculenta</i>	117.6 -118.5	<i>Cucumis sativus</i>
100.7	<i>Quercus agrifolia</i>	117.6 -137.0	<i>Manihot Glaziovii</i>
100.8	<i>Vigna Catjang</i>	117.6 -139.3	<i>Hevea brasiliensis</i>
100.9 -120.5	<i>Gossypium</i> sp. (cotton)	118.3	<i>Pinus Gerardiana</i>
101.0	<i>Manniophyton fulvum</i>	118.5	<i>Cicer arietinum</i>
101.3	<i>Pinus monophylla</i>	118.6	<i>Nicotiana Tabacum</i>
101.4 -121.7	<i>Brassica campestris</i>	118.6	<i>Laurus indica</i>
101.7 -109.0	<i>Croton Tiglium</i>	118.9	<i>Phaseolus inamoenus</i>
101.72-133.5	<i>Lepidium sativum</i>	119.0	<i>Nigella sativa</i>
101.8	<i>Eruca sativa</i>	119.5	<i>Gynandropsis pentaphylla</i>
101.8	<i>Brassica juncea</i>		
102.6	<i>Sinapis arvensis</i>	119.6	<i>Anethum graveolens</i>
102.7	<i>Cajanus bicolor</i>	119.7	<i>Trifolium repens</i>
103.0 -115.0	<i>Sesamum indicum</i>	119.7	<i>Omphalea megacarpa</i>
103.3	<i>Sinapis chinensis</i>	119.7 -130.7	<i>Cucurbita Pepo</i>
104.0	<i>Mucuna urens</i>	119.7 -135.0	<i>Helianthus annuus</i>
104.8	<i>Melampyrum arvense</i>	119.91-122.5	<i>Argemone mexicana</i>
105.0	<i>Raphanus Raphanistrum</i>	120.3	<i>Citrullus Naudinianus</i>
		120.4 -129.3	<i>Citrullus Colocynthis</i>
105.0	<i>Balanites aegyptiaca</i>	120.5	<i>Pinus Abies</i>
105.1	<i>Daucus Carota</i>	120.9	<i>Pinus Pinea</i>
105.3	<i>Pimpinella Anisum</i>	120.9	<i>Pinus Picea</i>
105.6	<i>Sinapis dissecta</i>	120.9	<i>Pyrus communis</i>
106.0 -107.0	<i>Citrullus vulgaris</i>	121.0	<i>Cucurbita maxima</i>
106.0	<i>Carya Pecan</i>	121.0	
106.0	<i>Pisum sativum</i>	121.0 -130.8	<i>Zea Mays</i>
106.8	<i>Carya ovata</i>	122.5	<i>Martynia louisiana</i>
106.9 -125.0	<i>Lycopersicum esculentum</i>	123.7	<i>Citrullus vulgaris</i>
		123.9	<i>Tilia parvifolia</i>
107.2	<i>Vicia sativa</i>	124.0 -143.0	<i>Glycine hispida</i>
107.25	<i>Citrus Limonia</i>	124.3	<i>Trifolium pratense</i> var. <i>perenne</i>
107.5	<i>Myrtus communis</i>		
108.0	<i>Pinus monophylla</i>	124.58	<i>Cheiranthus Cheira</i>
108.5	<i>Caryodendron orinocense</i>	126.0	<i>Citrus aurantifolia</i>
		126.0 -129.6	<i>Cucurbita Pepo</i>
108.51	<i>Luffa aegyptiaca</i>	126.1	<i>Daphne Cnidium</i>
108.6	<i>Pimpinella Anisum</i>	126.3	<i>Celosia cristata</i>
108.8	<i>Ptychotis ajowan</i>	126.6 -133.8	<i>Guizotia abyssinica</i>
108.9	<i>Prunus Laurocerasus</i>	126.9	<i>Rhus glabra</i>

127.6	<i>Lactuca scariola</i> var. oleifera	142.2	<i>Torreya nucifera</i>
128.5	<i>Sorbus Aucuparia</i>	143.3	<i>Armoracia rusticana</i>
128.5	<i>Carum Carvi</i>	143.3	<i>Morus alba</i>
128.6	-134.8 <i>Aleurites ricinodendron</i>	145.6	-160.7 <i>Stillingia sebifera</i>
128.9	<i>Caragana arborescens</i>	145.7	<i>Pinus montana</i>
129.5	<i>Fraxinus excelsior</i>	147.1	<i>Pinus sylvestris</i>
130.3	<i>Cephalotaxus drupacea</i>	147.7	-148.2 <i>Aleurites Ricinodendron</i>
130.4	<i>Setaria italica</i>	147.8	<i>Rubus fruticosus</i>
130.4	-130.7 <i>Vitis vinifera</i>	147.8	<i>Arbutus Unedo</i>
130.9	<i>Kickxia elastica</i>	148.0	-166.0 <i>Cannabis sativa</i>
131.7	<i>Cytisus Laburnum</i>	148.9	<i>Oenothera biennis</i>
131.7	-134.86 <i>Amoora Rohituka</i>	149.0	-161.3 <i>Elaeococca vernicia</i>
132.1	-151.7 <i>Juglans regia</i>	149.7	-161.5 <i>Humulus Lupulus</i>
132.6	-157.5 <i>Papaver somniferum</i>	151.6	-171.7 <i>Aleurites cordata</i>
133.3	<i>Cucumis Melo</i>	152.5	<i>Papaver somniferum</i>
133.7	<i>Amorpha fruticosa</i>	152.5	<i>Ribes rubrum</i>
134.0	<i>Spartium junceum</i>	152.8	<i>Gynocardia odorata</i>
134.0	<i>Maclura pomifera</i>	152.8	<i>Crataegus Oxyacantha</i>
135.0	<i>Pyrus Malus</i>	153.6	<i>Lappa minor</i>
135.1	<i>Cupressus sempervirens</i>	153.9	<i>Citrus aurantifolia</i>
135.1	<i>Bryonia dioica</i>	154.2	<i>Medicago sativa</i>
135.1	-142.4 <i>Myagrurn sativum</i>	154.8	<i>Thuja occidentalis</i>
135.49	<i>Carthamnus Oxyacantha</i>	154.9	-155.3 <i>Hesperis matronalis</i>
135.6	<i>Melia Azedarach</i>	155.0	<i>Rhamnus cathartica</i>
135.7	<i>Phaseolus vulgaris</i> var. albus	155.0	-164.0 <i>Aleurites moluccana</i>
137.1	-140.0 <i>Asparagus officinalis</i>	156.3	<i>Pinus Cembra</i>
137.3	<i>Barbarea praecox</i>	156.5	<i>Juglans Sieboldiana</i>
137.8	<i>Trigonella Foenum- graecum</i>	159.2	<i>Pinus Cembra</i>
138.0	<i>Hyoscyamus niger</i>	161.0	<i>Robinia Pseudoacacia</i>
138.0	-139.0 <i>Funtumia elastica</i>	162.1	<i>Lallemantia iberica</i>
138.1	-141.2 <i>Echinops ritro</i>	167.2	<i>Vaccinium Myrtillus</i>
138.5	<i>Croton Elliotianus</i>	169.2	<i>Vaccinium Vitis-idaea</i>
138.64-149.93	<i>Carthamnus tinctorius</i>	170.0	-201.0 <i>Linum usitatissimum</i>
140.0	<i>Linaria reticulata</i>	171.0	<i>Hyptis spicigera</i>
141.2	<i>Phaseolus coccineus</i>	174.8	<i>Rubus idaeus</i>
141.4	<i>Parthenocissus quinque- folia</i>	177.3	-204.0 <i>Plukenetia conophora</i>
		180.3	<i>Fragaria vesca</i>
		193.3	-195.0 <i>Perilla nankinensis</i>
		196.45	<i>Perilla frutescens</i>

OIL GROUPS

Taxaceae §	Phalarideae
<i>Cephalotaxus</i> (D)	<i>Phalaris</i> (SD)
<i>Torreya</i> (ND)	Hordeae
<i>Torreya</i> (D)	<i>Secale</i> (SD)
Pinaceae *	<i>Triticum</i> (SD)
<i>Pinus</i> (D)	<i>Hordeum</i> (SD)
<i>Thuja</i> (D)	Palmae †
<i>Cupressus</i> (D)	<i>Phoenix</i> (ND)
Gramineae §	<i>Corypha</i> (W)
Paniceae	<i>Mauritia</i> (F)
<i>Panicum</i> (D)	<i>Raphia</i> (W, F)
Maydeae	<i>Ceroxylon</i> (W)
<i>Zea</i> (SD)	<i>Klopstockia</i> (W)
Oryzeae	<i>Jessenia</i> (ND)
<i>Oryza</i> (ND)	<i>Euterpe</i> (SD)
Andropogoneae	<i>Oenocarpus</i> (F, SD Kernel)
<i>Sorghum</i> (SD)	<i>Areca</i> (F)
	<i>Elaeis</i> (F)

- Attalea (F)
 Cocos (F)
 Acrocomia (F)
 Astrocaryum (F)
 Liliaceae §
 Asparagus (D)
 Myricaceae †
 Myrica (F)
 Juglandaceae *
 Juglans (D)
 Carya (SD)
 Betulaceae *
 Corylus (ND)
 Betula (ND)
 Fagaceae *
 Fagus (SD)
 Quercus (ND)
 Ulmaceae §
 Ulmus (ND)
 Moraceae †
 Morus (D)
 Maclura (D)
 Ficus (W)
 Humulus (D)
 Cannabis (D, W)
 Olacaceae †
 Ongokea (D)
 Ximenia (ND)
 Coula (ND, F)
 Chenopodiaceae §
 Bassia (F)
 Amaranthaceae †
 Celosia (D)
 Ranunculaceae *
 Nigella (SD)
 Delphinium (SD)
 Lardizabalaceae
 Akebia (ND)
 Magnoliaceae * †
 Magnolia (SD)
 Illicium (SD)
 Myristicaceae
 Viola (F)
 Scyphocephalum (F)
 Lauraceae †
 Cinnamomum (F)
 Persea (F)
 Machilus (F)
 Tetranthera (F)
 Lepidadenia (F)
 Litsea (F)
 Lindera (ND)
 Laurus (F, SD)
 Papaveraceae *
 Chelidonium (SD)
- Argemone (D)
 Papaver (W, D)
 Cruciferae *
 Barbarea (SD)
 Nasturtium (SD)
 Cheiranthus (D)
 Armoracia (SD)
 Hesperis (D)
 Eruca (SD)
 Sinapis (SD)
 Brassica (SD)
 Lepidium (SD)
 Myagrum (D)
 Isatis (SD)
 Crambe (SD)
 Raphanus (SD)
 Capparidaceae † †
 Gynandropsis (SD)
 Resedaceae †
 Reseda (D)
 Moringaceae †
 Moringa (ND)
 Saxifragaceae *
 Philadelphus (W)
 Ribes (D)
 Rosaceae *
 Chrysobalanaceae
 Moquilea (ND)
 Couepia (D)
 Pruneeae
 Prunus (ND)
 Rubeae
 Rubus (D)
 Potentilleae
 Fragaria (D)
 Pomeae
 Cydonia (ND)
 Sorbus (D)
 Pyrus (SD)
 Eriobotrya (F)
 Crataegus (D)
 Leguminosae §
 Ingeae
 Pithecolobium (F)
 Mimoseae
 Parkia (F)
 Pentaclethra (ND)
 Amherstieae
 Tamarindus (SD)
 Caesalpinieae
 Caesalpinia (SD)
 Genisteae
 Lupinus (ND)
 Spartium (SD)
 Trifolieae
 Trigonella (ND)
 Medicago (D, ND)

- Melilotus (ND)
 Trifolium (ND, SD)
 Ornithopus (ND)
- Loteae
 Anthyllis (ND)
 Lotus (ND)
- Galegeae
 Amorpha (D)
 Galega (ND)
 Robinia (D)
 Caragana (D)
- Hedysareae
 Onobrychis (ND)
 Arachis (ND)
- Dalbergieae
 Pongamia (F)
 Dipteryx (F)
- Viciaeae
 Cicer (SD)
 Lens (SD)
 Vicia (SD)
 Pisum (SD)
- Phaseoleae
 Cajanus (SD)
 Glycine (D)
 Canavalia (SD)
 Mucuna (SD)
 Phaseolus (SD)
 Voandezia (SD)
 Vigna (SD)
 Dolichos (SD)
- Tropaeolaceae
 Tropaeolum (ND)
- Linaceae
 Linum (D, W)
- Zygophyllaceae † †
 Balanites (SD)
- Rutaceae †
 Limonia (F)
 Citrus (SD)
- Simarubaceae †
 Simaruba (F)
 Brucea (ND)
 Irvingia (F)
 Picramnia (F)
- Burseraceae †
 Canarium (ND, F)
- Meliaceae †
 Melieae
 Melia (F, D)
- Trichillieae
 Chisocheton (ND)
 Amooria (D)
 Carapa (F)
 Trichilia (F)
- Polygalaceae §
 Polygala (ND, F)
- Xanthophyllum (F)
 Skaphium (F)
- Euphorbiaceae †
 Plukenetia (D)
 Euphorbia (W)
 Pedilanthus (W)
 Croton (SD, D)
 Manniophyton (SD)
 Caryodendron (SD)
 Ricinus (ND)
 Aleurites (D)
 Elaeococca (D)
 Jatropha (SD)
 Hevea (D)
 Manihot (D)
 Omphalea (SD)
 Stillingia (D, F, seed coat)
- Anacardiaceae †
 Anacardium (ND)
 Buchanania (F)
 Pistacia (ND)
 Rhus (F, SD, seed kernel)
- Celastraceae *
 Euonymus (SD)
 Celastrus (ND)
- Aceraceae *
 Acer (D?)
- Hippocastanaceae
 Aesculus (ND)
- Sapindaceae †
 Paullinia (F)
 Allophylus (F)
 Sapindus (ND)
 Schleicheria (F)
 Nephelium (F)
 Blighia (F)
 Ungnadia (ND)
- Rhamnaceae §
 Rhamnus (D)
- Vitaceae †
 Vitis (ND)
 Parthenocissus (SD)
- Tiliaceae †
 Apeiba (ND)
 Tilia (SD)
- Malvaceae †
 Abelmoschus (SD)
 Gossypium (W, SD)
- Bombacaceae †
 Adansonia (F)
 Eriodendron (SD, W)
- Sterculiaceae †
 Theobroma (F)
 Sterculia (ND)
 Basilloxylon (F)
- Ochnaceae †
 Lophira (F)

Caryocaraceae	Araganum (ND)
Caryocar (F)	Mimusops (F)
Dipterocarpaceae †	Ebenaceae † †
Shorea (F)	Diospyros (SD)
Vateria (F)	Oleaceae * †
Theaceae † †	Fraxinus (SD)
Thea (ND)	Olea (ND)
Guttiferae †	Salvadoraceae
Moronobeae	Salvadora (F)
Symphonia (F)	Loganiaceae †
Pentadesma (F)	Strychnos (F)
Cariniceae	Apocynaceae †
Garcinia (F)	Kickxia (D)
Calophylleae	Funtumia (D)
Calophyllum (ND)	Nerium (ND)
Mesua (ND)	Strophanthus (ND)
Flacourtiaceae †	Asclepiadaceae †
Oncoba (F)	Asclepias (W)
Hydnocarpus (F)	Calotropis
Gynocardia (D)	Cynanchum (W)
Caricaceae † †	Verbenaceae †
Carica (F)	Aegiphila (F)
Combretaceae †	Labiatae *
Terminalia (ND)	Lallemantia (D)
Thymelaeaceae §	Perilla (D)
Daphne (SD)	Hyptis (D)
Myrtaceae †	Solanaceae †
Myrtus (SD)	Hyoscyamus (D)
Lecythidaceae †	Capsicum (SD)
Bertholletia (SD)	Lycopersicum (SD)
Lecythis (ND)	Datura (SD)
Rhizophoraceae †	Nicotiana (SD)
Poga (ND)	Scrophulariaceae §
Onagraceae *	Linaria (D)
Oenothera (D)	Melampyrum (ND)
Araliaceae † *	Bignoniaceae †
Hedera (ND)	Pithecoctenium (F)
Umbelliferae *	Pedaliaceae † †
Anthriscus (SD)	Sesamum (SD)
Cuminum (SD)	Martyniaceae †
Apium (SD)	Martynia (SD)
Petroselinum (SD)	Rubiaceae †
Pimpinella (SD)	Coffea (ND)
Anethum (SD)	Caprifoliaceae †
Cornaceae *	Sambucus (ND)
Cornus (ND)	Cucurbitaceae †
Ericaceae *	Hodgsonia (F)
Arbutus (D)	Telfairia (ND)
Vaccinium (D)	Acanthosicyos (SD)
Sapotaceae †	Luffa (SD, F)
Payena (F)	Bryonia (SD)
Mimusops (F)	Citrullus (SD)
Palaquium (F)	Cucumis (SD)

Cucurbita (SD)	Madia (D)
Echinocystis (SD)	Echinops (D)
Compositae §	Lappa (D)
Vernonia (ND)	Carthamnus (D)
Helianthus (D)	Mogumia (W)
Guizotia (D)	Lactuca (SD)

* Temperate † Subtropical ‡ Tropical § Widely distributed

D=Drying SD=Semi-drying ND=Non-drying F=Fat W=Wax

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